

Fig. 11. Pressure variation in a sample assembly as shown in Fig. 9a with the Bi I-II transition of 25.4 kb in comparison with the average load pressure for each run

Circles and squares are for runs at room temperature and 140°, respectively.
Diameter/thickness ratio close to 9

recorded by the thermocouple. Studies have shown that this temperature is only two to three degrees higher than the temperature recorded by a thermocouple embedded and electrically insulated by a thin sample wafer under pressures of at least 15 kb. Automatic control of furnace temperature assures uniformity of sample temperature to within $\pm 5^\circ$ for several days if necessary.

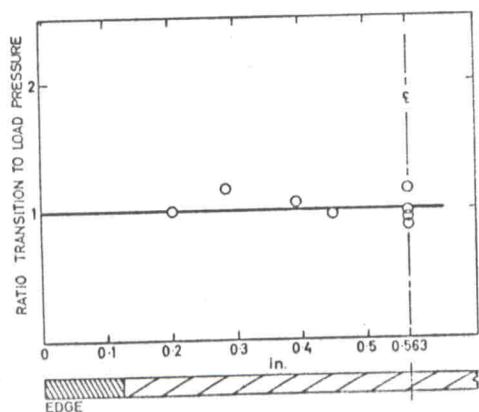


Fig. 12. Pressure variation study as in Fig. 11 but with a diameter/thickness ratio of 14

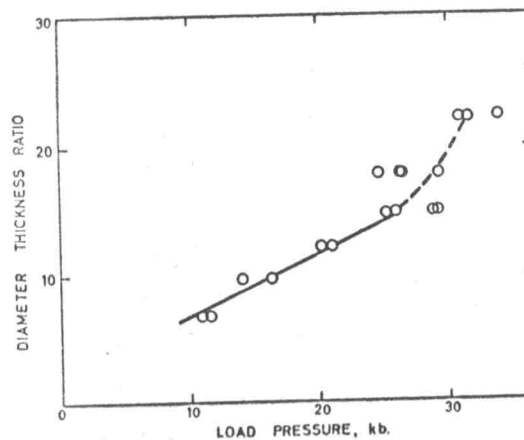


Fig. 13. Results showing the variation of load pressure with the diameter thickness ratio of an assembly shown in Fig. 9a to obtain the Bi I-II transition of a centrally placed sample

Application

Results of studies made using anvil apparatus have been described elsewhere and will be referred to only briefly here. High-pressure synthesis and equilibrium are represented by studies of silica isotypes,¹¹ polymorphism of lead oxides,¹² manganous fluoride,¹³ boric oxide,¹⁴ titanium dioxide¹⁵ and, more recently, the interesting zinc oxide polymorphism (to the NaCl structure) at pressures over 110 kb.¹⁶ An extensive equilibrium study involving the olivine-spinel transition¹⁷ and its geophysical applications, and a purely crystal chemical study¹⁸ of the pressure-dependence of the ionic size at which a phase transformation occurs in certain rare earth ABO_4 compounds, also attest to the potential of the method in systematic studies involving literally several hundreds of runs each.